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Investigation of User Acceptance for TV Programmes

This paper will at first detail the problem of user acceptance in case of TV utilisation in general. The second part presents an outline of the current state of TV audience research in Germany on a daily base. In a third part conceptual reflections about extensions of the system will be given, considering the actual technical development of alternative digital distribution channels for TV programmes (e.g. IPTV, DVB-T, DVB-H).

1. Introduction

In contrast to a theatre, where the audience can be monitored at a glance and the applause of the spectators allows a direct conclusion about the acceptance of the show, in television such a conclusion is much more difficult and can be obtained only in an indirect way.

Ten years ago, the number of TV consumers per single TV programme or the share of the audience between the programmes was a nearly unimportant information. Nowadays, the “quota” is a central point in rating and judgement of TV programmes, frequently causing controversial discussions.

For the programme managers in television companies the question how to obtain a viewer response was very important, hence one was looking for technical solutions for an objective evaluation. This concerns private as well as public service broadcasters, they all want to know how well they are doing compared to their competitors. Every morning the TV companies tensely wait for the audience ratings of the previous evening, ascertained by the GfK Fernsehforschung (television audience research) in Nuremberg. GfK (**G**rowth **f**rom **K**nowledge [1]) work by order of AGF (**A**rbeits**g**emeinschaft **F**ernsehforschung), which is a television research co-operative of public and private service broadcasters [2].

The quality of and the attendance’s interest in the programme are measured by means of the quota representing the share of the audience between the programmes. Due to the growing advertising market the quota becomes more and more a business

importance. The question arises how a measurement procedure has to be implemented if the results are of that importance. Surely, objectivity and reliability are required. Furthermore, short response time and fast evaluation of the results are essential requirements. If the results are of good accuracy and reliability, TV companies and advertising organisations will be able to establish a kind of “standard currency”. Based on these statistics the immense advertising funds will be split between the competitors. In Germany television audience research completely goes without a valuation of the programme. Only the pure viewing duration of a TV programme will be recorded, but separately for every individual living in the household and with a timing accuracy of one second (see description of GfK system, section 2).

The technical problem mainly consists of the exact investigation of TV consumption, optionally with valuation of the TV programme’s quality by any active TV consumer (imagine e.g. a system quite similar to the one used in school with marks from 1 to 6). The amount of information to be stored, transmitted to GfK’s central computer system and finally analysed is relatively small.

2. The GfK System for Evaluation of Television Audience Shares

The main features of evaluation of the television audience shares are relatively unknown to the public, although the GfK has many public relation activities. A statistical projection is calculated based on the objective record of the TV customer’s behaviour within a representative sample (panel of TV households). This projection is relatively exact, comparable with the accurate extrapolation of election results. The panel is a careful selection of TV households, made e.g. according to technical and socio-demographic aspects. Therefore, the television panel is representative for the population in Germany. It consists of more than 5.500 households with a total of about 13.000 persons. This panel is the largest base for television audience research in the world [1]. Hence, the research results are in great demand among market and opinion researchers.

Every panel household is equipped with a GfK-Meter, a device measuring the TV consumption. The configuration is shown in Figure 1. The TV set itself is only a monitor, the tuner is replaced by a separate device, the GfK-Meter. With a precision of one second a switching between analogue TV channels (terrestrial, cable, or satellite) or the use of the teletext function will be recorded. Furthermore, the use of a video recorder will be investigated too. If there is a digital receiver in the household, the receiver will be replaced by a separate set-top box which records the digital TV consumption and

transfers these data to the GfK-Meter. If the panel household is equipped with more than one TV set, every TV set will be provided with a GfK-Meter. These additional devices are connected to the main device.

GfK-Meter's remote control contains a registration button for every person in the panel household. By means of these buttons each person indicates start and stop of TV consumption, thus enabling an investigation of not only the number of TV sets receiving a special programme, but also the individuals watching it.

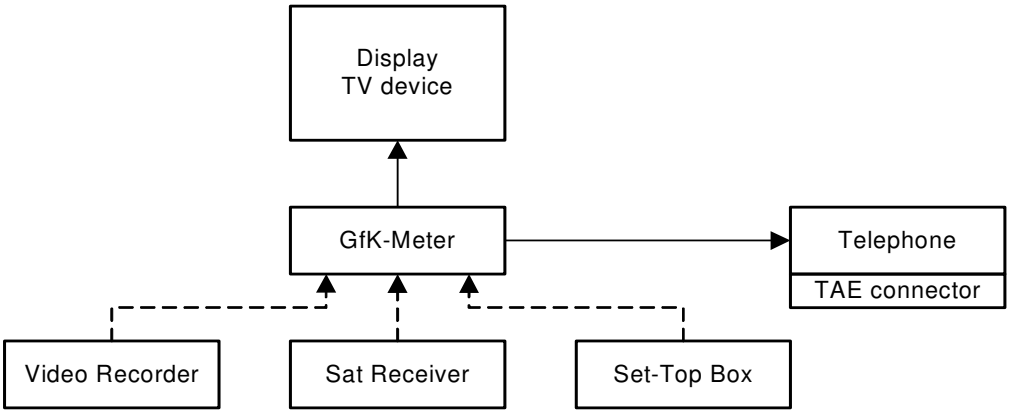

Figure 1: Devices for measurement of TV consumption, installed in the panel household [1]

Every night the data stored on the GfK-Meter are automatically downloaded to GfK's central computer system in Nuremberg via telephone line and modem or via cellulare telephony. Before final storage and analysis the data are checked regarding quality and plausibility. Then the consumer data are merged with the programme reports, which GfK receives from the broadcasting companies, thus enabling a detailed analysis of TV consumption.

Actually, the Swiss company Telecontrol [3] provides the equipment for the investigation of TV consumption in Germany. Their devices have a wider functional range than currently used.

3. Conceptual Reflections about Extensions of the System for TV Audience Research

The discussions exclusively focus on digital broadcast technologies. Analogue TV was excluded, since it will not play an important role in the future. In 2010, the covering with terrestrial digital TV will be achieved for nearly all regions in Germany, and the European Union intends to switch off all analogue transmitters until 2012 [4]. These plans will surely influence the reception via cable and satellite too.

Due to the growing number of TV distribution channels and the increasing portable and mobile TV consumption (DVB-T, DVB-H, DMB) an extension and modification of the technical base for TV audience research is essential. To avoid a huge number of different devices, all new technologies should be bundled into one device, whenever possible. A rough block scheme of a system for recordation and evaluation of TV user data is shown in Figure 2.

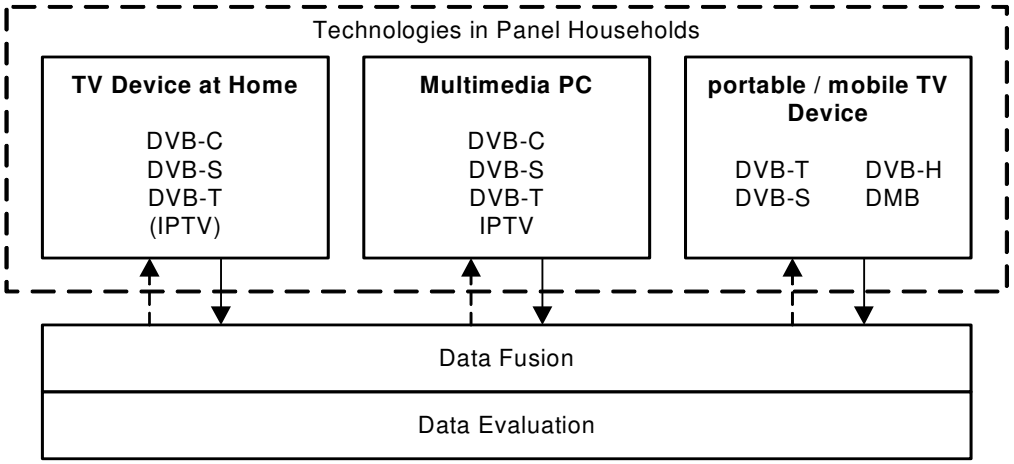

Figure 2: Technologies for TV consumption in panel households

Appliances for TV consumption, which use has to be recorded, can mainly be assigned to three groups: Home-TV sets, multimedia PC, and portable or mobile TV sets.

3.1. Home-TV Sets

Figure 3 shows a possible block scheme of a Home-TV set, including data recording. The TV screen itself is only used as a monitor, fed via analogue (SCART) or digital (HDMI, DVI) interfaces. An additional device (comparable to the former GfK-Meter) should contain at least three digital tuners, some common interfaces for Pay-TV, components to handle the external interfaces of the device, a processor, and software to control the device and to record the TV consumption. Furthermore, interfaces for the connection with digital recorders (hard disk, DVD, and following technologies), which use should be also measured, have to be implemented too. According to the situation in the panel household the resources of the device might be enabled or disabled by technicians during installation. The device will be equipped with a remote control, which has to provide some special functionality.

The recorded user data will be stored in the device and transmitted to the central computer system for further processing via telephone line, internet, or mobile transceiver

(e.g. text message). The transmission might be realised either once a day (during the night as actually done) or for central realtime evaluation immediately after detection of an event. If there is more than one TV set in the household, the respective investigation devices have to be connected for centralised data storage. Then only one of the devices will transmit all the user data to the central computer system. The network is preferred to be wireless (e.g. ZigBee, BlueTooth).

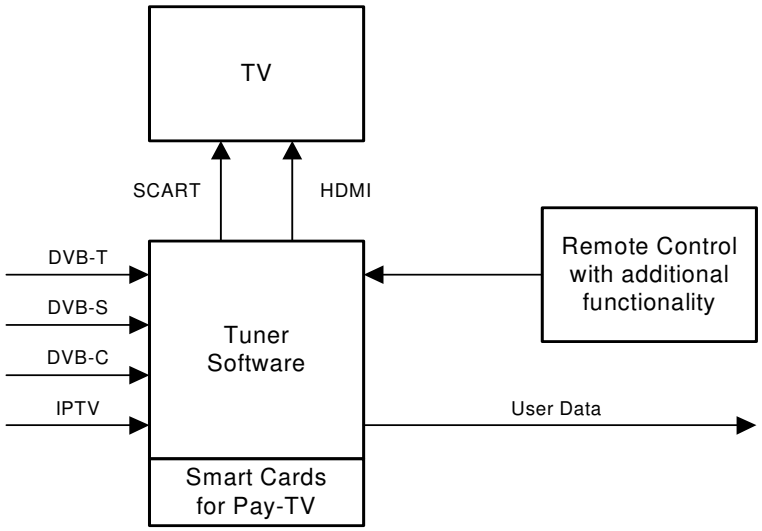

Figure 3: Modifications for a home-TV set configuration

3.2. Multimedia PCs

Modern PCs are easily able to decode and display TV signals. More and more multimedia PCs and (in the future) combinations of PC and TV set will be used for TV consumption. Therefore, it is necessary to measure the use of such devices in the panel households too. In Figure 4 a possible structure of such a system is shown. The TV signal can be received by means of internal (TV plug-in cards) as well as external (e.g. for USB interface) TV receivers, that might contain mainly three different types of tuners (DVB-S, DVB-C, DVB-T). Due to the availability of high-rate Internet connections the TV signal could alternatively be an Internet stream (IPTV). Furthermore, the TV programme might be stored on PC's hard disc to be viewed later or to be written on a DVD. The PC can be used to view commercial or private DVDs as well.

For multimedia PCs the measurement of TV consumption is only possible by means of special software which has to be installed on the user's PC and which will complement or modify the multimedia software of the computer. Due to the immense variety of commercial and free software for multimedia purposes the design and implementation

of such a software will be extremely complex and risky. In contrast, it is easily possible to store the investigated data. The data transfer to the central computer system might be realised directly via the Internet connection of the PC or via the main device in the panel household (wireless connection required, see above) – the probability of a multimedia PC as the only TV device in a household without Internet connection seems to be quite small, so a mobile connection between PC and central computer system seems not necessary in this case.

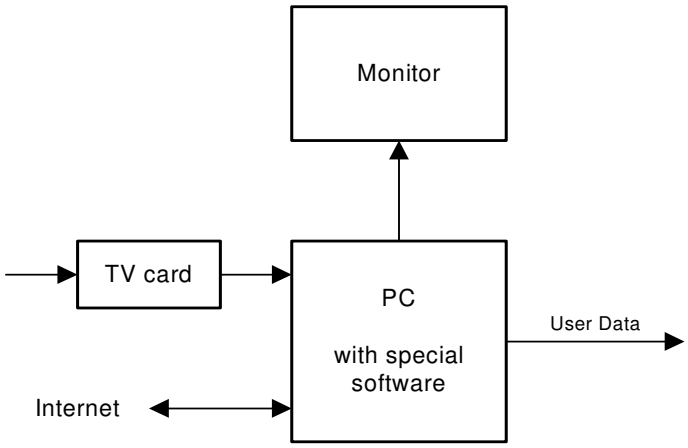

Figure 4: Configuration for TV audience research in case of multimedia PCs

For a short time, there are also boxes for DVB-T reception available (e.g. Artec T3 Ultima Electronics [5]). They can be directly connected to computer monitors via VGA interface and consequently enable uncomplicated TV reception. This configurations also allows a portable use of TV which is very hard to record. The only possibility is to replace these DVB-T boxes by boxes which provide the same extent of services but are complemented with additional hardware and software for recording the TV consumption and a module for a radio transmission of the collected data.

3.3. Portable and Mobile TV Reception

A third possibility for TV reception is provided by devices allowing portable or mobile TV consumption. In this case the wide range of potential devices for TV reception and the fast innovation based variations of these devices have to be taken into account.

Certainly, the TV audience research can be organised relatively easily for TV reception with portable devices in second and weekend homes or summer houses (DVB-T, DVB-S). In principle, one could apply the same technologies and devices as used for the investigation of TV consumption in the case of conventional home-TV sets – maybe not necessarily fully equipped. The transmission of the collected data must be realised with an integrated mobile transceiver.

The recordation of mobile TV reception via DVB-T in vehicles can be realised in principle similar to the investigation of TV consumption with portable devices in second and weekend homes as explained above. But the installation of the additional equipment in the cars involves much more work and complexity.
In contrast, it will be much more difficult to record TV consumption with portable DVB-T receivers in pocket size, that are now brought to market (e.g. Neovia Di.Toy [6]).
Another scenario which must be studied is portable or mobile TV reception with laptops equipped with a DVB-T TV card. A recordation of TV use can be realised by an additional software module as described in context with multimedia PCs.
More difficulties arise with the recordation of mobile TV reception with mobile phones. For this purpose the transmission standards DVB-H and DMB (Digital Multimedia Broadcasting) can be used. These broadcast variants are based on DVB-T respectively DAB, and therewith they allow a transmission in the terrestrial DVB-T or DAB network. The actual data rates of approximately 300 kbps allow the transmission of pictures in the dimension of 320 x 240 pixels (QVGA, Quarter Video Graphics Array). Without fundamental changes in the mobile phone software the TV consumption cannot be investigated in this case. The vast number of existing devices and rapid technological changes in this sector make this idea practically impossible to be realised. The only case where the analysis of the user behaviour is conceivable is an on demand subscription service. Then all the required data are available at the provider's side. This similarly applies for transmissions of TV services via UMTS to mobile phones.

3.4. Conclusions

Recapitulating the previous discussion one can state that the realisation of TV audience research with the current demands regarding reliability and representativeness (as formulated above) becomes more and more complex and finally even practically impossible. This can be ascribed to the growing number and plurality of portable and mobile reception devices allowing TV consumption at nearly all places and in quite every situation. The more frequent use of PCs for TV consumption further contributes to the aggravation of the situation. Regarding the investigation of portable and mobile TV consumption one has to observe and react according to the acceptance and spread of new technologies in the population.
Such an extensive investigation of TV consumption as accomplished up to now will not be possible any more. Therefore, restrictions will be indispensable for future TV

audience research. It must be discussed for which of the presented scenarios a recordation of user data will be reasonable and desirable in the next years. After all, the quota of such a reduced and restricted panel has to be as exact as possible.

For significant results in the future the panel must be ensured to remain representative. Members of the panel have to be chosen under strict criteria, TV audience research should not exclude certain technologies used for TV reception or user groups.

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